the narrowest one, and also about two inches shorter, was firmly riveted and soldered to the longer one, at a point about two inches from its probe-pointed extremity, so as to lie flat upon it, and reinforce it. The springs thus attached to each other were given, by bending, an over-bent prostatic curve, of such a degree and length, as would insure the carrying of the beak of the catheter, into which it was to be inserted, gently but firmly elevated against the upper surface of the urethral canal throughout its course.

The introduction of such an instrument into the urethra requires, of course, a good deal of unfolding and straightening of the prostatic curve in the hands in passing it through the straight portion of the urethra. After it has been inserted an inch or two within the meatus, the penis must be gently grasped in the left hand and carried over into the fold of the groin, while with the right hand the instrument is glided along the urethra and the closing of the prostatic end resisted by bending the straight end somewhat in an opposite curve to the prostatic end. As soon as the sinus of the bulb is reached, the instrument is carried over to the median line, the penis held nearly perpendicular to the body, and the instrument pushed on into the bladder. The catheter is now held firmly in one hand while the external end of the stylet is depressed somewhat between the thighs and withdrawn.

It has been suggested by a friend, that a spiral twist of a little more than one turn, about 1½ or 2 inches long, in the prostatic end of the stylet, would improve its power of adaptation. The suggestion is a most excellent one, as I conceive, and would have been tried, but it has thus far been impossible to get it executed. A further improvement might be made by substituting, for the straight part of the stylet, a stiff steel wire; the watch-spring being soldered and riveted firmly to it.

With both of these modifications of the Nélaton catheter, I have been enabled to catheterize my patient with the greatest ease, and on several occasions when no other instrument could be passed. For this reason the details of this communication have been made somewhat fuller than may at first appear necessary, and also because it is hoped that the suggestions may, on some early future occasion, secure a fair trial at the hands of the profession.

ART. VII.—*On Suspension in the Treatment of Fractures of the Leg.* By JOHN H. PACKARD, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia. (With five wood-cuts.)

THE advantages of suspension in the treatment of fractures of the leg do not seem to me to have been duly appreciated by the profession. The plan is but little used among those with whose practice I am familiar, while in the text-books and treatises it is dismissed with only scant mention. The directions given in regard to it in these works are, indeed, so vague and brief that no one not accustomed to devising apparatus for surgical cases would venture to make, by their guidance alone, his first essay in this line of practice.

An impression no doubt prevails that the swinging of a broken leg necessitates complicated, cumbersome, and perhaps expensive apparatus, to the exclusion of the ordinary and familiar appliances; or at least that the latter must be dispensed with, to be replaced by such as have not yet been fully tested. Thus in a clinical lecture published in the *Philadelphia Medical Times* for March 15, 1871, Dr. A. Hewson, advocating suspension by means of the anterior wire frame of Dr. Nathan R. Smith of Baltimore, contrasts this plan with what he calls "the fracture-box treatment." The inference fairly to be drawn from his remarks is, that if placed in the fracture-box the limb *must* lie on the bed, and that if suspension is to be used the anterior wire splint is the only proper means.

My object in the present paper is not only to urge the advantages of suspension, but to set forth the principles upon which it should be employed, and the way in which it can be adapted to any apparatus which may in the judgment of the surgeon be best suited, in each case, to keep the fragments in apposition.

The advantages of suspension are:—

(1) As to the efficiency of the treatment. The patient cannot possibly be kept altogether motionless, and if the limb is duly adjusted and properly swung, the fragments are made to follow each the movements of the other, so that their relative position is unchanged even in the cases of restless children.

(2) As to the comfort of the patient. Even from the very first he can be allowed to sit up in bed, reading, writing, or attending to business; a most important point, especially to persons in the more cultivated classes, who find the enforced idleness of lying flat on the back intolerably irksome.

Again, by very slight turning the patient can shift his weight, so as to alter the bearing points of his body, thus avoiding much weariness and often preventing the formation of bed-sores.

Again, the bed-pan can be readily used, enabling us to dispense with the "fracture-bed," which is particularly objectionable in private practice.

Once more, the frequent change of angle both at the knee and hip obviates in great measure the stiffening of these joints, and the use of the limb is regained much sooner than if the extended posture is maintained throughout the period of consolidation.

(3) As to the comfort of the surgeon. The risk of displacement is really so much diminished by the proper suspension of the limb, that a case so treated needs a less constant and anxious attendance than if this plan is not adopted. To country practitioners, in dealing with distant cases,

or to city surgeons who have many other demands on their time, this is a matter of no small moment.

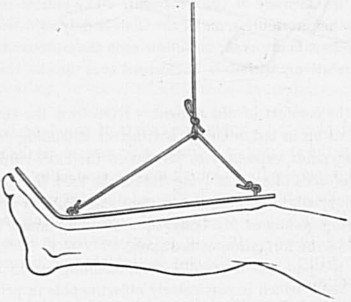
Now as to the principles on which the suspension of fractured legs should be employed.

The great point is to get perfect freedom of motion within a limited range. And this motion must be both at the hip and knee. Flexion and extension in both these joints are essential, as may be seen by a slight examination of the mechanical conditions of the case. Hence it seems to me that Dr. Hamilton's direction[1] for the use of "two leather splints, one on either side, which are made to extend from above the knee to near the metatarso-phalangeal articulations," is erroneous, and would, if effectively carried out, defeat the object in view. Side splints ought always to be used, but should reach just high enough to leave the knee unconfined.

In order that the limb may swing freely, it must have an upper and a lower point of suspension. The upper should be about two feet above the lower, which latter should be about eight inches above the upper line of the leg when everything is adjusted.

At the lower point, the cord or cords by which the leg is suspended should run freely through a ring, or through a loop of the upper cord, to be made in a manner presently to be described. (See Fig. 1.)

Fig. 1.



There are various devices for arranging the upper cord. For private practice, and indeed in hospitals also, I much prefer a single strong upright post about six feet high, with a long foot extending say four feet under the bed, and two shorter lateral ones parallel with the side of the bed. At the upper end of this post is an arm projecting inwards, strongly bracketed, and having a pulley either screwed into it or sliding in a slot so as to be fixed at any desired point by a nut above the arm.

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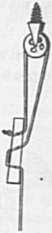
[1] Principles and Practice of Surgery, p. 308.

A less convenient form, generally used I believe in hospitals, is a frame with two upright posts and a cross-bar, the posts resting either on the bed or on the floor.

When the ceiling is quite low, the pulley may be screwed into one of the joists over the bed; but this makes the cord longer than is necessary, and the other plans are better. Occasionally in an old-fashioned four-post bedstead a cross bar may be fastened to the side pieces of the curtain frame at the top if these are firm enough.

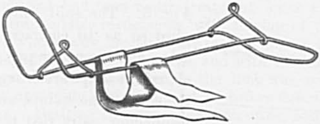
However the pulley may be adjusted, the upper cord is run through it, and one end fastened to the upper part of a tent-block, the other end being then passed through the other holes in the block (Fig. 2), and fastened in a slip-knot below. We may either make a knot in the cord about eight inches from the end, to prevent the slip-knot from running all the way down, or make the knot through a small ring.

Fig. 2.



Next as to the arrangement of the lower cord. This may be either single or double, the former being preferable except when the fracture-box is used.

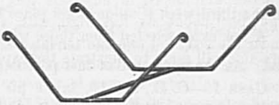
Fig. 3.



A very good plan is to apply side splints of wood or binder's board, and then to use the anterior wire frame with wire loops for attaching the cord. In this frame the fractured leg may be cradled by means of a series of strips of bandage arranged as in Fig. 3; the foot being duly secured to the corresponding part of the frame. If the splints are accurately and efficiently applied, the limb rests in perfect security in such a cradle, and any one of the strips of bandage may be tightened or loosened as circumstances may indicate.

If the fracture-box is preferred, two cords must be used. These may be attached to the side pieces of the box by means of holes bored through each side piece near its upper edge, one close to the knee and the other close to the foot. But in this method it is necessary, in order to examine the leg, to

Fig. 4.

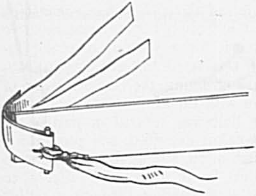


let the apparatus down on to the bed. I therefore prefer having a frame made of strong steel wire, as in Fig. 4, in which the box containing the limb may rest, one cord being attached to the arms on either side, and both cords running through the loops or ring before described.

When the limb is thus swung, the foot is lowered and the knee raised, or *vice versâ*, by simply sliding the lower cord or cords through the loop or ring of the upper. Another way of attaining the same object is to move the suspending frame so as to bring the upper point of suspension more nearly over the knee or foot.

I may here mention a method of making extension by means of the side splints, which has in my hands been entirely satisfactory in a number of cases in private and hospital practice. Four strips of adhesive plaster cut lengthwise with the piece and varying in length and breadth according to the size of the limb, are provided, say about eighteen inches long by two inches wide for an adult. Each of them is then split up from one end for about half its length; the end which remains whole is next folded on itself, the adhesive surfaces in contact, and a small piece of wood placed in the loop so made. A slit is now cut close to the bit of wood, through which a loop of bandage may be passed. The mode of application will be at once seen by Fig. 5. The split ends being applied so as to embrace the ankle below and the upper part of the leg above, the strips are brought around the ends of the splints, and the corresponding pairs tied together on the outside of the latter. Extension is made by the two lower strips, against counter-extension by the two upper ones, the force being increased or lessened by tying the ends of the bandage more or less tightly.

Fig. 5.



I have introduced these remarks on this mode of making extension, because I believe it to add very much to the security of the limb, and to the efficiency of the lateral pressure by means of the splints. It is much more necessary when the fracture has taken place near the ankle-joint than when the bones have been broken higher up, unless in the latter case the line of fracture is oblique, when its value is in proportion to the degree of obliquity. It is also, of course, of use mainly during the first ten days or two weeks of the treatment, and may be wholly dispensed with by the end of the third week if union takes place in the ordinary manner.

A few cases selected from those which have occurred to me in private practice will serve to illustrate the expedients which may be employed.

CASE I.—C. E., æt. 10, broke his left tibia transversely by jumping from a low roof to the ground, in April, 1869. In my absence from the city he was seen and pasteboard side splints applied by Dr. Harlan. Upon visiting him in the evening, I found him very restless, so as to make suspension especially desirable. As a temporary expedient, I carried a piece of clothes line on each side from the post at the head of the bed to that at the foot, then tying another piece across just over the broken limb, I folded two pocket handkerchiefs, one in the shape of a square sling and the other cravat-wise, the former to receive the limb and the latter to pass over the transverse cord and make the suspension. So completely did this arrangement answer the purpose that it was not changed until, at the end of two weeks, it seemed safe to let the child sit in a chair with his leg on a pillow in another one. There was absolutely no deformity whatever.

CASE II.—R. M. C., a master carpenter, æt. about 50, fell between some joists and broke both bones of the right leg about four inches above the ankle, November 14, 1870. I saw him about an hour afterwards, and placed the limb in a fracture-box with a pillow. A pulley was then screwed into one of the joists of the low ceiling of his room, and to a cord passed over this the fracture-box was swung by means of two other short cords fastened through holes bored in the sides of the box. The foot was raised or lowered as he desired by simply moving his bed so as to change its relative position to the pulley.

This patient was allowed to sit up in bed, and did perfectly well, walking about in six weeks from the date of the injury.

CASE III.—Mr. K., æt. 58, sustained a very oblique fracture of both bones of the left leg, March 3, 1871, by a fall of about eight feet, some steps giving way with him. He was a man of extremely nervous and sensitive temperament, and had been under treatment for a year or more for insomnia; uncontrollable restlessness, with tossing of the arms and movement of the whole body, rendered the task of fixing the fragments one of no small difficulty. Ether was given, and with the kind assistance of Drs. J. F. Meigs, Hewson, and Maury, the limb was secured in pasteboard splints with extending strips applied as before described, and put into a fracture-box. Desiring to inspect the limb often, and at the same time to use uninterrupted suspension, I had a steel frame made as in Fig. 4, to which the cords were attached, an upper cord passing through a pulley sliding in the cross-bar of a gallows frame resting on the floor at either side of the bed. Union took place very favourably, although the patient suffered excessively from neuralgia, which attacked first the injured limb, then the stomach, afterwards the intercostal muscles, was then transferred to the rectum by the renewal of old hemorrhoidal trouble, and finally returned to the tissues in the neighbourhood of the fracture. The persistence of this symptom delayed the complete restoration of the use of the limb, but after about six months Mr. K. began to walk freely with a stick. He has now a perceptible limp in his gait, but it is owing not to any deformity at the seat of fracture, but to the annoyance he still suffers from his old enemy.

CASE IV.—Mr. W., æt. 34, fell on the pavement on Sunday, November 30, 1873, and sustained a fracture of the left tibia close to the ankle-joint, which was completely dislocated, the end of the tibia resting on the back of the foot, which was twisted outwards. Dr. W. K. Gilbert, who lived close by, was called in and made a partial reduction. On my seeing the patient an hour afterwards, complete reduction was effected, and the limb secured by side-splints with extension and counter-extension on the plan before mentioned. As it was Sunday, we could not have a suspending apparatus made, but a wooden splint of proper angle was bandaged to the upper surface of the leg and foot, and the whole was laid on a pillow. The next day a gallows frame with a single post was made, and the limb swung up.

On Tuesday morning, less than forty-eight hours after the injury, Mr. W. was sitting up reading his paper. He had scarcely any inconvenience whatever beyond that of the confinement. On the twenty-first day the silicate of soda bandage was put on, and on the twenty-sixth he was moving about his room with crutches. He is now, February 12, 1874, walking about, attending to business, with scarcely a trace of the severe injury he sustained.

ART. VIII.—*Cases of Premature Delivery at the Eighth Month; Extremely Small Children; Successful Employment of Artificial Respiration; Unconscious Pregnancy; Rupture of Umbilical Artery; Successful Ligation.* By A. B. ISHAM, M.D., of Cincinnati, Ohio.

INSTANCES of premature labour are not rare; in fact, despite all the exhortations of modern medical moral essayists, public health conventions, and sanitary congresses, they are yet only too common. Neither is it unusual that well-developed immature infants should survive, though stillborn, with no breath of life save that breathed into them. The majority die, but the pages of medical literature are dotted all over with the records of the living. It may even not be so very exceptional that premature births under two pounds weight live and thrive well, but if so, the archives of medicine afford scanty evidence of them. Perhaps it is not uncommon for pregnancy to exist and advance to parturition in an unconscious subject; still, after a somewhat diligent search, I find Taylor has collected nearly all well-authenticated cases in his *Manual of Medical Jurisprudence.* Therefore in presenting the following cases it is believed that they may be received, without further apology, as not unworthy auxiliaries to those veterans which have long stood service within the confines of the profession and on the medico-legal border.

CASE I.—June 3, 1872, was called to see Mrs.——, *enceinte* for the first time. Was suffering from uterine pains of a severe character, together with hemorrhage. The os uteri was slightly dilated. Administered morphia by the mouth in free doses, which had the happy effect of quieting the pains and checking the hemorrhage. I was again with her the 17th of July, in the 8th month of pregnancy, her menses having ceased in the early part of the previous November. The os was about one-half dilated, the head presenting and labour proceeding regularly. In about an hour, after a remarkably easy labour, she was delivered of a male child so small and deeply cyanosed, that if by any chance it possessed a spark of life, I thought it "only born to die." However, I detected a very feeble and infrequent heart-beat. Immediately it was placed in warm